In the United States Court of Federal Claims

OFFICE OF SPECIAL MASTERS

Filed: May 13, 2014

**********	PUBLISHED
CASSANDRA BURCHETT, *	
*	No. 12-119V
Petitioner, *	Special Master Dorsey
*	
v. *	Entitlement denied; Human Papillomavirus
*	Vaccine ("HPV"); Gardasil; Guillain-Barré
SECRETARY OF HEALTH *	Syndrome ("GBS"); Alternative Causation;
AND HUMAN SERVICES, *	Significant Aggravation; Gastroenteritis;
*	Upper Respiratory Infection ("URI").
Respondent. *	
**********	

Mark Theodore Sadaka, Esq., Englewood, NJ, for petitioner.
Darryl J. Wishard, U.S. Department of Justice, Washington, DC, for respondent.

DECISION DENYING ENTITLEMENT[1]

I. Introduction

On February 22, 2012, Cassandra Burchett ("petitioner") filed a petition for compensation under the National Vaccine Injury Compensation Program ("the Program")[2] in which she alleged that a human papillomavirus ("HPV" or "Gardasil") vaccine she received on March 26, 2010, caused her to develop Guillain-Barré Syndrome ("GBS"). Petition ("Pet.") at 1-2. Respondent recommended against compensation, arguing that petitioner had not presented

[1] Because this published decision contains a reasoned explanation for the action in this case, the undersigned intends to post this decision on the website of the United States Court of Federal Claims, in accordance with the E-Government Act of 2002 § 205, 44 U.S.C. § 3501 (2006). In accordance with the Vaccine Rules, each party has 14 days within which to request redaction "of any information furnished by that party: (1) that is a trade secret or commercial or financial in substance and is privileged or confidential; or (2) that includes medical files or similar files, the disclosure of which would constitute a clearly unwarranted invasion of privacy." Vaccine Rule 18(b). Further, consistent with the rule requirement, a motion for redaction must include a proposed redacted decision. If, upon review, the undersigned agrees that the identified material fits within the requirements of that provision, such material will be deleted from public access.

[2] The Program comprises Part 2 of the National Childhood Vaccine Injury Act of 1986, 42 U.S.C. §§ 300aa-10 et seq. ("the Act"). Hereafter, individual section references will be to 42 U.S.C. § 300aa.

adequate evidence to show that the Gardasil vaccine had caused her GBS. See Respondent's Report ("Resp't's Rep't), filed July 11, 2012, at 8-15. Further, respondent alleged that petitioner had an antecedent gastrointestinal and/or upper respiratory infection which "support[ed] a viral or infectious basis for the onset of [petitioner's] GBS." Id. at 10. The parties submitted expert reports and an entitlement hearing was held in Washington, DC, on October 9, 2013, during which the parties' experts testified. Petitioner filed her post-hearing brief on December 13, 2013, and respondent filed her post-hearing brief on January 6, 2014. This matter is now ripe for adjudication.

Respondent does not dispute that petitioner was diagnosed with GBS on April 1, 2010. See Joint Submission, dated September 4, 2013 ("Jt. Sub.") at 2. The issues to be decided, therefore, are: (1) whether petitioner has presented preponderant evidence that the HPV vaccine she received on March 26, 2010, was a substantial contributing factor to the onset of her GBS, and (2) even if so, whether respondent has presented preponderant evidence that an alternative cause, such as antecedent infection, was the sole factor for her GBS. See Jt. Sub. at 2-3.

After a review of the entire record, see § 300aa-13(a)(1), the undersigned finds that petitioner has failed to provide preponderant evidence that the Gardasil vaccine caused her GBS. Because petitioner did not meet her burden of proof on causation, respondent does not have the burden of establishing a factor unrelated to the vaccination caused petitioner's injuries. See Doe v. Sec'y of Health & Human Servs., 601 F.3d 1349, 1359 (Fed. Cir. 2010) ("[petitioner] Doe never established a prima facie case, so the burden (and attendant restrictions on what 'factors unrelated' the government could argue) never shifted"). Nevertheless, respondent has proven by preponderant evidence an alternative cause of petitioner's GBS, namely, an antecedent infection.

Therefore, even if petitioner had established her case by a preponderance of the evidence, her arguments fail because respondent has proven that petitioner's antecedent infection, not her vaccination, was the sole cause of her GBS. Accordingly, petitioner is not entitled to compensation and her petition must be dismissed.

II. Factual Background

A. Issues to be Decided

Prior to the hearing, the parties filed a joint submission identifying (1) facts not in dispute; (2) facts in dispute; (3) issues not in dispute; and (4) issues in dispute. Jt. Sub. at 1-2. These are addressed in turn below.

i. Facts Not In Dispute

Petitioner had her first episode of GBS when she was a child, and that episode of GBS is not in dispute. She was diagnosed with GBS on November 29, 1999, when petitioner was five years old. Jt. Sub. at 1.

The parties also stipulate that petitioner was diagnosed with and treated for viral gastroenteritis on March 19, 2010. Jt. Sub. at 1. Petitioner received the subject Gardasil

vaccination on March 26, 2010, at the office of her primary care physician, Dr. Andrew Gellady. Id. On March 26, 2010, the day that the vaccine was administered, Dr. Gellady also diagnosed petitioner with "possible bacterial conjunctivitis bilaterally." Id.

On March 30, 2010, petitioner saw Dr. Gellady for headache, numbness of the extremities, and body aches that began on March 28, 2010. Id. Dr. Gellady's assessment, based on these symptoms, was "reaction HPV vaccine – arthralgia[3] or early viral." On March 31, 2010, petitioner presented to Dr. Gellady with significant pain, inability to walk, extremity numbness, muscle cramping, and weakness. Jt. Sub. at 1. At this point, Dr. Gellady was concerned about GBS, questioned whether petitioner's symptoms were secondary to the HPV vaccine, ordered lab tests, and started petitioner on analgesics. Id.

On April 1, 2010, petitioner was admitted to All Children's Hospital ("ACH") "with a history of upper respiratory infection three weeks prior, acute gastroenteritis two weeks prior, and receipt of the HPV vaccine on March 26, 2010 …. a four-day history of progressive body muscle weakness, trouble walking, and a headache …. [as well as] emesis for the past day" Jt. Sub. at 2. At ACH, petitioner underwent a lumbar puncture to obtain a cerebral spinal fluid (CSF) sample. Assessment at that time was "lower extremity weakness, absent deep tendon reflexes, intact sensation, increased protein in the CSF, findings which are consistent with Guillain-Barré syndrome…secondary to her recent viral illness and of note she did have a Gardasil vaccine 1 week ago." Id.; Petitioner's Exhibit ("Pet'r's Ex.") 1.7 at 466. Petitioner was started on IVIG therapy. Jt. Sub. at 2.

Finally, the parties stipulate that petitioner was treated by Dr. Bunch, a neurologist, while hospitalized at ACH; that she developed a syndrome of inappropriate antidiuretic hormone secretion (SIADH), hemolytic anemia, adverse effects attributable to the IVIG treatment requiring a transfusion, and that her discharge diagnosis was GBS. Jt. Sub. 2; Pet'r's Ex. 1.7 at 471-72; Pet'r's Ex. 1.8 at 539, 541-42.

ii. Facts in Dispute

The parties dispute whether petitioner suffered from an upper respiratory infection between March 1 and March 19, 2010.

iii. Issues Not in Dispute

The parties stipulate that petitioner received a vaccine as set forth on the Vaccine Injury Table; that she was vaccinated in the United States; that she was diagnosed with GBS on April 1, 2010; that she suffered from the residual effects of her GBS for more than 6 months; and that she has not previously collected an award or settlement in a civil action regarding her alleged vaccine injury of GBS. Jt. Sub. at 2.

[3] "Arthralgia" is defined as "pain in a joint." Dorland's Illustrated Medical Dictionary (32d ed. 2012) ("Dorland's") at 150.

iv. Issues in Dispute

The parties dispute whether petitioner has presented preponderant evidence under Althen v. Sec'y of Health & Human Servs., 418 F.3d 1275, 1278 (Fed. Cir. 2005), that the HPV vaccine she received on March 26, 2010, was a substantial factor in causing her to develop GBS that was diagnosed on April 1, 2010. Jt. Sub. at 2. Moreover, assuming petitioner has proven a *prima facie* case under Althen, the parties dispute whether respondent has presented preponderant evidence "that a viral infection was the sole substantial factor for her GBS." Id. at 3.

B. Additional Relevant Medical History

In addition to the facts to which the parties stipulated, the following facts are relevant. Some of the above facts are repeated to provide context and continuity.

Petitioner was born full term on August 13, 1994, and had no chronic medical problems in early childhood. Pet. at 1; Pet'r's Ex. 1.9 at 630. In November of 1999, when she was five years old, petitioner began experiencing lower extremity weakness which caused her to limp, to fall down repeatedly, and to be unable to get up after falling. Pet'r's Ex. 1.9 at 628. On November 29, 1999, petitioner was admitted to ACH, where she was started on IVIG therapy. Id. After 4 days of this therapy, petitioner's neurologic deficits began to diminish and she regained the reflexes and strength in her legs. Id. at 628-29. She was discharged on December 2, 1999, with a diagnosis of GBS. Id. at 628. Hospital records note that petitioner had suffered from an upper respiratory tract infection several weeks prior to her admission. Id. at 628. A lumbar puncture with CSF analysis revealed elevated protein level of 199 (normal 15-45). Id. at 643.

For the next ten years, petitioner had periodic infections, but there is no indication in her medical records that her GBS symptoms recurred. For example, on May 22, 2007, when she was 12 years old, petitioner was diagnosed with tonsillitis. See, Tr. 39-41; Pet'r's Ex. 2.1 at 14. And on November 18, 2009, when she was 15, petitioner was diagnosed with a "viral syndrome." Ex. 2.1 at 11.

Petitioner was diagnosed with and treated for viral gastroenteritis by Dr. Gellady on March 19, 2010. Ex. 2.1 at 10. Her symptoms included vomiting, diarrhea, and headaches. She denied cough or head congestion. Id. On March 26, 2010, petitioner presented to Dr. Gellady's office with red eyes and was diagnosed with possible "bilateral conjunctivitis bilaterally." Id. at 9. Antibiotic eye drops were prescribed. Jt. Sub. at 1; Pet'r's Ex. 2 at 9. At that visit on March 26, 2010, petitioner received her first Gardasil vaccine. Id.

Four days later, Tuesday, March 30, 2010, petitioner presented to Dr. Gellady. Pet'r's Ex. 2.1 at 7. Her symptoms were noted as beginning on "Sunday [March 28, 2010] – Headache; feet started going numb. Whole body aches – muscles. Hips and back. Both hands numb – tingles. Feet also." Id. at 7. Examination showed 1 + deep tendon reflexes in the arms and knees and ½ + in the ankles with muscle strength 5/5. Id. Sensation in her feet was intact. Dr. Gellady's assessment was "reaction HPV vaccine - arthralgia early viral." Id.

The next day, March 31, 2010, petitioner returned to see Dr. Gellady. Pet'r's Ex. 2.1 at 6. Dr. Gellady noted that petitioner was "in a lot of pain. Can't walk. Hands and feet are numb. Back muscles are cramping. Legs are very sore …. [a]rms slightly sore. Can't bend over to touch her toes." Id. Dr. Gellady also noted that petitioner had "some nasal congestion". Id. A neurological examination revealed that petitioner had no deep tendon reflexes, though it is not clear what area was tested. Dr. Gellady's assessment was "myalgia weakness" and he documented "HPV?". Id. The exact wording of Dr. Gellady's notes from March 31, 2010, is unclear but the parties agree that he appears to have considered the HPV vaccine as a possible cause of petitioner's symptoms. Dr. Gellady also documented that he doubted that petitioner had a recurrence of her GBS. Id.

On April 1, 2010, petitioner's condition worsened and she was admitted to ACH. Pet'r's Ex. 1.7 at 464. Initial handwritten patient history and physical documented that "3 wks (weeks) ago →URI sx (symptoms)→cough/rhinnhea [sic][rhinorrhea]". Pe't'r's Ex. 1.9 at 608. The diagnosis was GBS, "possibly 2° to recent Giardisil [sic] vaccine and/or recent URI/AGE." Id. at 611. The author's signature is illegible.

A history and physical admission note by Dr. Leslie F. Carroll on April 1, 2010, documented the following pertinent history:

> This is a 15-year-old…with a 4-day history of progressive body muscle weakness accompanied with trouble walking, headache, and emesis…Of note, she received a Gardasil vaccine on 03/26/2010 and 2 days following started to have severe headaches with lower back pain. On the following day, the patient experienced trouble walking and described pain in her feet associated with numbness and tingling. She had URI symptoms 3 weeks ago and acute gastroenteritis 2 weeks ago which lasted for 24 hours…lumbar puncture…revealed CSF protein level of 210.
>
> Pet'r's Ex. 1.7 at 464-65.

Dr. Carroll performed a neurologic exam which showed that petitioner's upper extremities had strength 5/5 bilaterally with reflexes 2+ and symmetric, but no reflexes could be obtained in the lower extremities and motor strength in the lower extremities was diminished at 3/5 to 4/5. Pet'r's Ex. 1.7 at 466. Dr. Carroll's impression was GBS. "This may be secondary to her recent viral illness and of note she did have a Gardasil vaccine 1 week ago." Id. Dr. Carroll order IVIG therapy and a neurology consult. Id.

A neurology consultation was performed on April 2, 2010, by Dr. Shirley Terri Bunch. Pet'r's Ex. 1.7 at 471. Dr. Bunch noted that petitioner had a history of a URI 3 weeks ago, and gastroenteritis symptoms lasting for 24 hours two weeks prior to admission. Id. at 472. Dr. Bunch also noted that petitioner had received the Gardasil vaccine on March 26, 2010, and that 2 days later she began having headaches with low back pain. Id. Dr. Bunch considered the possibility of recurrent GBS and ordered that the IVIG be continued. Id. at 472-73.

On April 4, 2010, Dr. Bunch documented that petitioner presented with "ascending weakness and loss of deep tendon reflexes after 2 viral illnesses in quick succession along with a

Gardasil vaccination." Pet'r's Ex. 1.8 at 535. On April 7, 2010, Dr. Bunch noted that petitioner developed GBS, "thought to be related to a Gardasil infection." Id. at 528. And on April 9, 2010, Dr. Bunch wrote that petitioner "lost her reflexes…approximately 5 days after receiving a Gardasil immunization." Id. at 529.

Petitioner was discharged from the hospital on April 15, 2010, and was ordered to continue with physical and occupational therapy. Pet'r's Ex. 1.8 at 543, 562. The discharge summary was documented by Dr. Stefany B. Honigbaum, who wrote that petitioner had been admitted with a "presumed diagnosis of [GBS], given her CSF findings. This was thought to possibly be secondary to her recent URI illness, as well as her acute gastro and perhaps in part to the Gardasil vaccine received 1 week prior to this." Id. at 541. On discharge, petitioner was alert and oriented with normal speech. Id. at 543. But the deep tendon reflexes of both her upper and lower extremities had not returned, and her gait was unsteady, although she was able to walk with the aid of a walker. Id.

Petitioner saw Dr. Bunch for a follow-up office visit on May 6, 2010, for ongoing management of her GBS. Pet'r's Ex. 3 at 4. At this visit, Dr. Bunch documented that petitioner had GBS "secondary to a [sic] immunization with gardicil [sic]." Id. On June 10, 2010, petitioner returned to see Dr. Bunch, who noted that petitioner was able to walk independently in the house, but otherwise still required the use of her walker. Id. at 1. She continued to have physical and occupational therapy. Petitioner's deep tendon reflexes and motor strength had improved. Id. at 2. By July 27, 2010, petitioner's condition had vastly improved. Her gait was normal and the strength in her upper extremities had returned to 5/5 and the strength in her lower extremities was improved at 4/5. Pet'r's Ex. 8 at 3.

C. Resolution of Facts In Dispute

The parties dispute whether petitioner suffered from an upper respiratory infection between March 1 and March 19, 2010. Based on a review of the records and the testimony at hearing, the undersigned finds that petitioner did suffer from an upper respiratory infection approximately three weeks prior to the onset of her GBS. See Jt. Sub. at 2. On April 1, 2010, petitioner was admitted to ACH "with a history of upper respiratory infection three weeks prior, acute gastroenteritis two weeks prior, and receipt of the HPV vaccine on March 26, 2010 …."); Pet'r's Ex. 1.9 at 628 (hospital records note that petitioner had suffered from an upper respiratory tract infection several weeks prior to her admission); Pet'r's Ex. 1.7 at 472 (Dr. Terri Bunch, petitioner's treating neurologist noted in her April 2, 2010 neurology consultation that "[a]pproximately 3 weeks ago, [petitioner] had what was thought to be a URI and 2 weeks ago had gastroenteritis symptoms lasting for approximately 24 hours."); Pet'r's Ex. 1.8 at 541. (In the ACH discharge summary, Dr. Stefany Honigbaum noted that "[petitioner] was admitted to ACH with a presumed diagnosis of Guillain-Barré syndrome, given her CSF findings. This was thought to possibly be secondary to her recent URI illness, as well as her acute gastro and perhaps in part to the Gardacil [sic] vaccine received 1 week prior to this"); Pet'r's Ex. 10 at 1 (On March 19, 2010, petitioner had symptoms of a "diffuse viral infection, initially with symptoms of URI and subsequently with gastroenteritis"). While the undersigned finds that petitioner suffered from an upper respiratory infection approximately three weeks prior to the

onset of her GBS, the undersigned does not pinpoint an exact date upon which the onset of the upper respiratory infection occurred.

D. Guillain-Barré syndrome

GBS is a "rapidly progressive ascending motor neuron paralysis of unknown etiology, frequently seen after an enteric or respiratory infection." Dorland's at 1832. Individuals afflicted with GBS present:

> with parenthesis of the feet, followed by flaccid paralysis of the entire lower limbs, ascending to the trunk, upper limbs, and face; other characteristics include slight fever . . . absent or lessened tendon reflexes, and increased protein in the cerebrospinal fluid without a corresponding increase in cells.

Id.

The cause of GBS has not been definitively established but "[a]n autoimmune mechanism following viral infection has been postulated." Dorland's at 1832. There is an "autoimmune attack on peripheral nerves…thought to be generated by an immune response against components of various stimuli which …overlap with antigens in the peripheral nerves." Tr. 19. The condition is rare and is a response to a "viral syndrome" or "occasionally a vaccination." Tr. at 20.

The symptoms of GBS "usually develop over several days." Tr. 16. The majority of cases are diagnosed based on clinical presentation, but electrodiagnostic and spinal fluid testing may also confirm the diagnosis. Tr. 18. The onset of the condition is confirmed by objective motor or autonomic dysfunction found on neurological examination, such as loss of deep tendon reflexes and motor weakness. Tr. 98; Pet'r's Ex. 14 at 1.

GBS is generally a monophasic illness, meaning that it occurs only once. Tr. 34. There are, however rare, cases of recurrent GBS. Tr. 34. In a Kaiser Permanente study of 550 verified cases of GBS, there was an incidence of 1.47 cases of GBS per 100,000 persons. Resp't's Ex. G at 3.[4] Of those, only six individuals had recurrent GBS (1.1% of the 550). Id. Of the 550 cases of GBS, 18 had onset within six weeks of a trivalent inactivated influenza vaccine. Id. at 1. None of the six persons with recurrent GBS had any exposure to vaccines within the two months prior to the onset of recurrent GBS. Id.

III. Discussion

The Vaccine Act established the Program to compensate vaccine-related injuries and deaths. § 300aa-10(a). "Congress designed the Vaccine Program to supplement the state law civil tort system as a simple, fair and expeditious means for compensating vaccine-related injured persons. The Program was established to award 'vaccine-injured persons quickly, easily,

[44] Roger Baxter et al., "Recurrent Guillain-Barré Syndrome Following Vaccination," 54(6) Clinical Infectious Diseases 800-04 (2012).

and with certainty and generosity.'" Rooks v. Sec'y of Health & Human Servs., 35 Fed. Cl. 1, 7 (1996) (quoting H.R. Rep. No. 908 at 3, reprinted in 1986 U.S.C.C.A.N. at 6287, 6344).

A. Standards for Adjudication

Petitioner's burden of proof is a preponderance of the evidence. § 300aa-13(a)(1). The preponderance of the evidence standard, in turn, has been interpreted to mean that a fact is more likely than not. Moberly v. Sec'y of Health & Human Servs., 592 F.3d 1315, 1322 n. 2 (Fed. Cir. 2010). Proof of medical certainty is not required. Bunting v. Sec'y of Health & Human Servs., 931 F.2d 867, 873 (Fed. Cir. 1991). A petitioner who satisfies this burden is entitled to compensation unless the government can prove, by a preponderance of the evidence, that the vaccinee's injury is "due to factors unrelated to the administration of the vaccine." § 300aa-13(a)(1)(B).

B. Petitioner's *Prima Facie* Case under Althen

To receive compensation under the Program, petitioner must prove either: (1) that she suffered a "Table Injury"—i.e., an injury listed on the Vaccine Injury Table—corresponding to a vaccine that she received, or (2) that she suffered an injury that was actually caused by the HPV vaccine. See §§ 300aa-13(a)(1)(A) and 11(c)(1); Capizzano v. Sec'y of Health & Human Servs., 440 F.3d 1317, 1319-20 (Fed. Cir. 2006). Petitioner must show that the vaccine was "not only a but-for cause of the injury but also a substantial factor in bringing about the injury." Moberly, 592 F.3d at 1321 (quoting Shyface v. Sec'y of Health & Human Servs., 165 F.3d 1344, 1352-53 (Fed. Cir. 1999)).

Because petitioner does not allege she suffered a Table injury, she must prove that the HPV vaccine she received caused her injury. To do so, she must establish, by preponderant evidence: (1) a medical theory causally connecting the vaccine and her injury ("Althen Prong One"); (2) a logical sequence of cause and effect showing that the vaccine was the reason for her injury ("Althen Prong Two"); and (3) a showing of a proximate temporal relationship between the vaccine and her injury ("Althen Prong Three"). Althen, 418 F.3d at 1278; § 300aa–13(a)(1).

The causation theory must relate to the injury alleged. Thus, a petitioner must provide a reputable medical or scientific explanation that pertains specifically to the vaccinee's case, although the explanation need only be "legally probable, not medically or scientifically certain." Knudsen v. Sec'y of Health & Human Servs., 35 F.3d 543, 548-49 (Fed. Cir. 1994). Petitioner cannot establish entitlement to compensation based solely on her assertions. Rather, a vaccine claim must be supported either by medical records or by the opinion of a medical doctor. § 300aa-13(a)(1). In determining whether petitioner is entitled to compensation, the special master shall consider all material contained in the record, § 300aa-13(b)(1), including "any . . . conclusion, [or] medical judgment . . . which is contained in the record regarding . . . causation . . . of the petitioner's illness." § 300aa-13(b)(1)(A). The undersigned must weigh the submitted evidence and the testimony of the parties' offered experts and rule in petitioner's favor when the evidence weighs in his favor. See Moberly, 592 F.3d at 1325-26 ("Finders of fact are entitled—indeed, expected—to make determinations as to the reliability of the evidence presented to them and, if appropriate, as to the credibility of the persons presenting that evidence"); Althen, 418 F.3d at 1280-81 ("close calls" are resolved in petitioner's favor).

(1) Althen Prong One: Petitioner's Medical Theory

Under Althen Prong One, petitioner must set forth a medical theory explaining how the received vaccine could have caused her alleged injury. Andreu v. Sec'y of Health & Human Servs., 569 F.3d 1367, 1375 (Fed. Cir. 2009). Under this prong, petitioner must make a showing that the received vaccine can cause the alleged injury. Pafford v. Sec'y of Health & Human Servs., 451 F.3d 1352, 1355-56 (Fed. Cir. 2006).

Petitioner's theory of causation must be informed by a "sound and reliable medical or scientific explanation." Knudsen, 35 F.3d at 548; see also Veryzer v. Sec'y of Health & Human Servs., 98 Fed. Cl. 214, 223 (2011) (noting that special masters are bound by both § 300aa-13(b)(1) and Vaccine Rule 8(b)(1) to consider only evidence that is both "relevant" and "reliable"). If petitioner relies upon a medical opinion to support her theory, the basis for the opinion and the reliability of that basis must be considered in the determination of how much weight to afford the offered opinion. See Broekelschen v. Sec'y of Health & Human Servs., 618 F.3d 1339, 1347 (Fed. Cir. 2010) ("The special master's decision often times is based on the credibility of the experts and the relative persuasiveness of their competing theories."); Perreira v. Sec'y of Health & Human Servs., 33 F.3d 1375, 1377 n.6 (Fed. Cir. 1994) ("An expert opinion is no better than the soundness of the reasons supporting it.") (citing Fehrs v. United States, 620 F.2d 255, 265 (Ct. Cl. 1980)).

a. Petitioner's Expert, Dr. Allan E. Rubenstein

Dr. Allan E. Rubenstein is a neurologist and clinical professor of neurology in pediatrics at New York University (NYU) Langone Medical Center in New York City. Pet'r's Ex. 11 at 5; Tr. 6. He obtained his medical degree from Tufts University Medical School in Boston and completed his internship and neurology residency at Columbia Presbyterian Medical Center, New York Neurological Institute, New York City. Pet'r's Ex. 11 at 1; Tr. 7-8. Dr. Rubenstein had postgraduate training in neurogenetics as well. Pet'r's Ex. 11 at 1; Tr. 10. He was an associate professor of neurology at Mt. Sinai School of Medicine from 1974 until 2009, at which time he moved to the NYU Medical Center. Pet'r's Ex. 11 at 3; Tr. 8-9. While at Mt. Sinai, he developed the autonomic function laboratory, and also started a clinic for neurofibromatosis, a genetic disease of the nervous system. Id. At Mt. Sinai, he spent approximately 50% of his time seeing and treating patients. Id. At NYU Medical Center, Dr. Rubenstein continues to see patients as well as teach medical students, residents and fellows. Tr. 10. Dr. Rubenstein is board certified in neurology. Pet'r's Ex. 11 at 1; Tr. 11. He has a faculty appointment in pediatric neurology at NYU Medical Center. Pet'r's Ex. 11 at 5; Tr. 21. He sees adult and pediatric patients in his clinical practice and he has treated patients with GBS. Tr. at 21, 23. Dr. Rubenstein has also authored an article on GBS.[5] Tr. at 23.

[5] Dr. Rubenstein has testified in court approximately 15 times over the past four years. Tr. 23. In one of those cases, Melnick v. Consolidated Edison, 959 N.Y.S. 2d 609 (Sup. Ct. 2013). Dr. Rubenstein's testimony was found by the court to be unreliable. Tr. 23-24. Dr. Rubenstein opined in that case that a child's "autism and developmental delay had stemmed from the low birth weight…of the premature birth of the child" triggered by the mother's "slip and fall accident." Tr. 24. The judge in the Melnick case questioned Dr. Rubenstein about whether there

Here, Dr. Rubenstein reviewed petitioner's medical records, including records from her first episode of GBS when she was five years old. Pet'r's Ex. 10 at 3. Dr. Rubenstein agreed that petitioner had an upper respiratory infection (URI) about two weeks prior to her first episode of GBS in 1999. Id. at 1; Tr. 73. Moving forward to 2010, Dr. Rubenstein agreed that on March 19, 2010, when petitioner saw Dr. Gellady, she reported that she had been vomiting, and had symptoms of a gastrointestinal infection, beginning on March 18, 2010. Tr. 73. Dr. Rubenstein agreed that petitioner had a diagnosis of gastroenteritis at that time. Tr. 74. Dr. Rubenstein also agreed that petitioner had nasal congestion as noted by Dr. Gellady on March 31, 2010. Tr. 76-77. And Dr. Rubenstein agreed that petitioner's treating physicians reference both upper respiratory and gastrointestinal infections as viral sources for her GBS. Tr. 77.

Dr. Rubenstein's causation theory in this case is that petitioner had a viral infection (URI and/or GI), that the viral infection initiated the process of GBS recurrence via molecular mimicry, and that the HPV vaccine also contributed to the development of petitioner's recurrent GBS through some "unclear mechanism." Tr. 35-36; 62-63; 72. Dr. Rubenstein testified that Gardasil was "a contributing factor of unclear mechanism, but likely related to its induction of [the] immune response." Tr. 63-64, 112.

In his expert report, Dr. Rubenstein opined that

> It is well-known that vaccines can worsen or induce problems in patients with autoimmune disease, presumably by presenting an antigen which stimulates an overactive or dysfunctional immune system. In Cassandra's case she was likely sensitized to antigens which cross react with CNS nervous systems components at an early age, and the subsequent use of Gardasil vaccine, possibly in combination with a viral infection, caused a new autoimmune event, resulting in a severe mixed form of GBS.

Pet'r's Ex. 10 at 2.

Dr. Rubenstein emphasized several times that he did not know the medical theory whereby petitioner's recurrent GBS was "stimulated or enhanced or somehow advanced" by the vaccination. Tr. 113. "[S]omehow – and I don't know exactly how – [the vaccine] likely stimulated the immune system to …recurrent [GBS]." Tr. 113. "[T]his patient had an -- as do most if not all patients with [GBS], an exposure to a virus which, for reasons unclear, as opposed to other viral involvement, somehow had the potential to induce an autoimmune response against peripheral nerves and that the vaccination, in the process of promoting an immune response, not necessarily because there is a crossreacting antigen to Gardasil . . . . but likely the two – the two

---

was a precedent for his theory that trauma could cause developmental delay. Dr. Rubenstein conceded that there was no such precedent. Tr. 93. Even though Dr. Rubenstein believed that the trauma of the mother's fall caused her to go into premature labor resulting in the child being born prematurely, causing the child's developmental problems, the judge "took a very narrow view" and "threw the case out." Tr. 93.

were both likely contributing factors, in my opinion, based upon the temporal relationship to onset." Tr. 62-63. "[W]hether [the mechanism] is due to stimulating the immune system to respond in a hyperactive way or encouraging the crosstalk between viral-induced responses in myelin components, I don't know the molecular mechanism, and I don't think that anybody does, but I think that there's any one of a number of possible and not unreasonable explanations to provide a theory for why the two [events (vaccination and virus)] are not coincidental." Tr. at 116.

In addition, Dr. Rubenstein testified that molecular mimicry did not play a role between a component of the HPV vaccine and petitioner's peripheral myelin, but rather, any mimicry that occurred stemmed from a viral infection. Tr. at 72.

Petitioner presented no research to support Dr. Rubenstein's theory that petitioner's GBS was stimulated or enhanced by the vaccination. Tr. 62-63. Dr. Rubenstein testified that "there's no research on such, but likely the two [both viral infection plus vaccination] – the two were both likely contributing factors, in my opinion, based upon the temporal relationship to onset." Tr. 62-63. Dr. Rubenstein cites an article by Souayah, see Pet'r's Ex. 12,[6] for the proposition that "molecular mimicry and other immune system stimulation mechanisms may play a role in mediating GBS after Gardasil vaccination." Pet'r's Ex. 12 at 888; Tr. 118-19. The Souayah article addresses the relationship between GBS and the HPV vaccine based on information from the Vaccine Adverse Event Reporting System (VAERS), but Souayah did not draw conclusions about HPV vaccine-related GBS. In addition, the Souayah article did not address the theory proposed by Dr. Rubenstein, namely that GBS associated with or caused by antecedent viral exposure may be further stimulated by the HPV vaccine.

Moreover, Dr. Rubenstein conceded that if petitioner had not received the Gardasil vaccination, then his testimony would be that petitioner developed recurrent GBS from a viral infection. See Tr. 81, 84-85. Dr. Rubenstein also admitted that, based on his own experience, he has never heard the theory that he proposes in this case, see Tr. 114, nor has he seen GBS following HPV vaccination in his practice. Tr. 120.

b. Respondent's Expert, Dr. Michael Kohrman

Dr. Michael Kohrman is a pediatric neurologist at the University of Chicago. Resp't's Ex. E at 1; Tr. 132. He obtained his medical degree from Rush Medical College and completed his internship and neurology training at the University of Chicago, and had some additional neurophysiology training at the University of Illinois in Chicago. Resp't's Ex. E at 1-2; Tr. at 132-33. Dr. Kohrman is board certified in pediatrics and neurology, with a special competency in child neurology and added qualifications in clinical neurophysiology and sleep medicine. Resp't's Ex. E at 3; Tr. at 132. At the University of Chicago, his work is about 80% clinical and 20% scholarly, and he sees pediatric patients almost exclusively. Tr. at 133-34. Dr. Kohrman is currently the editor of the Journal of Pediatric Epilepsy and is on the editorial board of three other publications. Resp't's Ex. E at 11; Tr. at 134-35. Dr. Kohrman testified that he has seen

[6] Souayah et al., "Guillain-Barré syndrome after Gardasil vaccination: Data from Vaccine Adverse Event Reporting System 2006-2009," 29 Vaccine 886-89 (2011).

over 100 children with GBS over the last 20 years, though he has never seen a case of recurrent GBS. Tr. at 133-34. His primary research area is pediatric epilepsy. Tr. at 135.

Dr. Kohrman opined that petitioner's recurrent GBS was caused by a viral infection via the theory of molecular mimicry. Tr. 139, 140-41, 145-46. He disagreed with Dr. Rubenstein's theory that Gardasil can cause an immune enhancement of virally-induced GBS, and he testified that he is not aware that such a theory has ever been discussed in the neurology or pediatric neurology community. Tr. 159. Moreover, he testified that there are no animal models to support Dr. Rubenstein's theory. Tr. 87-88, 160.

Further, as to the HPV vaccine, Dr. Korhman testified that there is "no evidence of homology…to lead to molecular mimicry to produce [GBS]." Tr. 146; 151. But Dr. Kohrman conceded that he lacks a complete working knowledge on the issue of homology and acknowledged that the medical community has not researched whether there is homology between certain antecedent infections thought to be causally related to GBS. Tr. 173-74, 175-76.

Based on the findings described in the article by Slade, Resp't's Ex. K at 756,[7] Dr. Kohrman testified that the incidence of GBS in females ages nine to 26 was lower in patients who received the HPV vaccine than the risk of GBS in unvaccinated patients, and less than the risk in the general population. Tr. 147-48. Dr. Kohrman disagreed that the Souayah article cited by Dr. Rubenstein supported petitioner's theory that the HPV vaccine was associated with GBS. Tr. 149. Dr. Korhman also testified that the Slade article summarizes the deficiencies of the Souayah article. Id. The article by Slade stated that Souayah overestimated the number of Gardasil vaccine doses actually administered and included patients who had symptoms beginning less than three days after vaccination, which did not meet the criteria for acute new onset, which was four to five days. Slade concluded that the data referenced by Souayah did not support Souayah's conclusions that there may be a risk of GBS following HPV vaccination. Tr. 149-50, 152; Resp't's Ex. D at 5-6.

In summary, Dr. Korhman disagreed with Dr. Rubenstein's theory that the HPV vaccine caused a "significant immune stimulus" leading to GBS because there is no increased risk of GBS in patients receiving the HPV vaccine. Dr. Kohrman was not aware of any immune system stimulation mechanism known to cause GBS after the HPV vaccine. Tr. 152. Dr. Korhman cited the Chao article, Resp't's Ex. C,[8] for the proposition that there is no increase in autoimmune markers and in immune signals associated with the HPV vaccine, except for a slightly increased risk of thyroiditis, which is not relevant to this case. Resp't's Ex. D. at 4; Tr. at 156. Dr. Korhman also cited the Slade article for the proposition that the HPV vaccine was "remarkably nonreactive" in terms of any serious adverse events. Id.

[7] Slade at al., "Postlicensure Safety Surveillance for Quadrivalent Human Papillomavirus Recombinant Vaccine", 302(7) JAMA 750 (Aug. 19, 2009).
[8] C. Chao et al., "Surveillance of autoimmune conditions following routine use of quadrivalent human papillomavirus vaccine," 271 J. Intern. Med. 193-203 (2012).

c. Petitioner's Treating Physicians

Several of petitioner's treating physicians documented the temporal association between the onset of petitioner's GBS and both the viral infections and the HPV vaccination.

Dr. Terri Bunch, petitioner's treating neurologist at ACH, noted in her April 2, 2010 neurology consultation that "[a]pproximately 3 weeks ago, [petitioner] had what was thought to be a URI and 2 weeks ago had gastroenteritis symptoms lasting for approximately 24 hours. On 3/26/10, she received Gardasil vaccine and 2 days following the vaccination began having headaches with low back pain." Pet'r's Ex. 1.7 at 472. On April 3, 2010, in a Neurology Progress Note, Dr. Bunch noted, "[a]pproximately 2 days after her vaccination with Gardasil, she began having numbness and tingling on her feet. She additionally had at least 2 viral syndromes and presented to the emergency room with blurred vision and weakness in her legs." Pet'r's Ex. 1.8 at 536.

In a Neurology Progress Note on April 4, 2010, Dr. Bunch noted "[t]he patient … presented with ascending weakness and loss of deep tendon reflexes after 2 viral illnesses in quick succession along with Gardasil vaccination." Pet'r's Ex. 1.8 at 534. In a progress note on April 6, 2010, Dr. Bunch noted that just prior to her first symptoms, petitioner "had 2 significant viral illnesses and then received her Gardasil vaccination." Id. And on April 7, 2010, Dr. Bunch noted, "[t]he patient is a 15-year-old Caucasian female who developed a GBS … thought to be related to a Gardasil vaccination." Id. at 528. In an April 9, 2010, Neurology Progress Note, Dr. Bunch noted, "[s]he lost her reflexes both knee, ankle, and arms approximately 5 days after receiving a Gardasil immunization." Id. at 529. Finally, on May 6, 2010, Dr. Bunch described petitioner as a "female who is seen in follow up after a presentation [at] all Children's Hospital with Guillain-Barré syndrome secondary to a[n] immunization with gardicil(sic)." Pet'r's Ex. 3 at 4.

Similarly, Dr. Leslie F. Carroll noted that petitioner's GBS "may be secondary to her recent viral illness and of note she did have a Gardasil vaccine 1 week ago." Pet'r's Ex. 1.7 at 466. In the ACH discharge summary, Dr. Stefany Honigbaum noted that "[petitioner] was admitted to All Children's with a presumed diagnosis of Guillain-Barré syndrome, given her CSF findings. This was thought to possibly be secondary to her recent URI illness, as well as her acute gastro and perhaps in part to the Gardacil [sic] vaccine received 1 week prior to this." Pet'r's Ex. 1.8 at 541.

During the hearing, Dr. Kohrman called into question the treating physicians' findings as to the statements suggesting an association between the vaccine and petitioner's GBS, suggesting that Dr. Bunch "may not have read the entire chart prior to writing her [progress notes]," and criticizing Dr. Honigbaum because she ordered prednisone for petitioner even though it has been known to worsen GBS symptoms. Tr. 178-80.

d. Evaluation of the Evidence

Althen Prong One requires a petitioner to set forth a medical theory explaining how the received vaccine could have caused the alleged injury. In this case, petitioner has failed to

postulate a theory by which the HPV vaccine allegedly "enhanced" her pre-existing virally-induced recurrent GBS. In attempting to articulate the "enhancement" aspect of his causation theory, Dr. Rubenstein conceded that his theory was unknown and that the HPV vaccine was "a contributing factor [to petitioner's immune response] of unclear mechanism." Tr. 63.

Likewise, none of petitioner's treating physicians documented any theory or mechanism whereby the HPV vaccine enhanced the viral infections leading to petitioner's recurrent GBS, as proposed by Dr. Rubenstein. Nor did any treating physician set forth any other theory for how the HPV vaccination alone, or in concert with the viral infections, caused petitioner's GBS. The treating physicians merely documented a temporal association between petitioner's receipt of the HPV vaccine and the onset of her recurrent GBS. Dr. Kohrman testified that he has not heard of Dr. Rubenstein's "enhancement" theory discussed in the neurology or pediatric neurology community, Tr. 159, and that there are no animal models to support the theory. Tr. 87-88, 160.

Without evidence of a medical theory, the temporal relationship is not enough. See Grant v. Sec'y of Health & Human Servs., 956 F.2d 1144, 1148 (Fed. Cir. 1992) (holding "a proximate temporal association alone does not suffice to show a causal link between the vaccination and the injury"). For all of these reasons, petitioner has not established by a preponderance of the evidence a medical theory explaining how the HPV vaccine can cause GBS in a patient who had antecedent viral infections.

(2) Althen Prong Two: Logical Sequence of Cause and Effect

Under Althen Prong Two, a petitioner must prove that there is a "logical sequence of cause and effect showing that the vaccination was the reason for the injury." Capizzano, 440 F.3d at 1324 (citing Althen, 418 F.3d at 1278). "Petitioner must show that the vaccine was the 'but for' cause of the harm … or in other words, that the vaccine was the 'reason for the injury.'" Pafford, 451 F.3d at 1356 (citations omitted).

a. Petitioner's Expert, Dr. Rubenstein

In his expert report, Dr. Rubenstein opines that "it is more likely than not that Gardasil vaccination was the determining event…possibly promoting an autoimmune event initially induced by a viral infection" which led to petitioner's GBS. Pet'r's Ex. 10 at 2. He explains that "[i]t is well known that vaccines can worsen or induce problems in patients with autoimmune disease, presumably by presenting an antigen which stimulates an overactive or dysfunctional immune system." Id. As such, petitioner was

> likely sensitized to antigens which cross react with CNS nervous system components at an early age, and the subsequent use of Gardasil vaccine, possibly in combination with a viral infection, caused a new autoimmune event, resulted in a severe mixed form of GBS.

Id. Based on Dr. Rubenstein's theory, petitioner had the antecedent viral infection which led to her recurrent GBS before her vaccination and, thus, she would have developed GBS even if she had not received the vaccine.

As discussed in Althen Prong One (above), however, Dr. Rubenstein admits in his report that the medical theory by which this event happens is only "possible." At the hearing, however, Dr. Rubenstein testified that petitioner's Gardasil vaccine was "more likely than not" and/or "substantial contributing factor" to her recurrent GBS which occurred in March 2010. Tr. 35-36.

Dr. Rubenstein testified that the fact that petitioner had a prior episode of GBS put her at risk for recurrence, Tr. 39, and any viral upper respiratory or gastrointestinal infection could be associated with a recurrence of GBS. Tr. 40. He noted that after petitioner's initial episode of GBS, from 1999 until March 2010, she had subsequent viral infections but she did not develop a recurrence of her GBS. Tr. 40-45.

On March 19, 2010, petitioner had symptoms of a "diffuse viral infection, initially with symptoms of URI and subsequently with gastroenteritis." Pet'r's Ex. 10 at 1. On the evening of March 18, 2010, she had vomiting, diarrhea and headache. She was seen by Dr. Gellady on March 19, 2010, and diagnosed with viral gastroenteritis. Pet'r's Ex. 2.1 at 10; Tr. 44, 74. A week later, on March 26, 2010, petitioner received the HPV vaccine. On that same day, petitioner was noted to have very red eyes and was diagnosed with "possible bacterial conjunctivitis bilaterally." Pet'r's Ex. 2.1 at 9. Four days later, on March 30, 2010, Dr. Gellady documented that petitioner had nasal congestion, and exudate and redness of her tonsils (tonsil 1+ exudate and red). Id. at 7. On March 31, 2010, petitioner had some "nasal congestion" and she had developed "diffuse motor weakness and numbness." Pet'r's Ex. 10 at 1. Petitioner was admitted to the hospital where she was diagnosed with GBS and treated with IVIG. Id.

Based upon the above chronology, Dr. Rubenstein opined that petitioner had her second episode of GBS, "2 weeks post viral symptomatology and within 5 days of Gardasil vaccination." Pet'r's Ex. 10 at 2. Dr. Rubenstein's opinion that petitioner's Gardasil vaccine contributed to her GBS is based on three reasons: (1) Gardasil is a rare but known antecedent to GBS; (2) petitioner's clinical course following Gardasil was "totally different from her first presentation" of GBS; and (3) an onset five days after vaccination is "consistent with previously reported cases of GBS following Gardasil." Id.

b. Respondent's Expert, Dr. Kohrman

Dr. Kohrman opined that petitioner's HPV vaccine did not cause her GBS. Tr. 139. Instead of the vaccination, Dr. Kohrman believed that one of the viral infections that occurred in the three weeks before onset was the most likely cause of petitioner's GBS. Tr. 141. When petitioner had her initial episode of GBS in 1999, the antecedent event was also a viral infection; namely, an upper respiratory infection. Tr. 141. Dr. Kohrman testified that in someone with recurrent GBS, like petitioner, where a virus initiated the process, it would be unlikely that a vaccine would play any causal role. Tr. 148. In his expert report, Dr. Kohrman states that he can "find no evidence in the literature that there is a cross reactivity between HPV vaccine and peripheral myelin." Resp't's Ex. D at 7. In addition, Dr. Kohrman states that there "is no evidence of significant aggravation of [petitioner's] recurrence of Guillain-Barré Syndrome by the vaccination with Gardasil." Id. He notes that most of petitioner's problems during her hospitalization were due to the high doses of IVIG treatment that she received. Id. Other than

the temporal association between vaccine and GBS, Dr. Kohrman stated that there was no evidence of a causal relationship between petitioner's vaccine and her GBS. Id.; Tr. 148, 172.

c. Evaluation of the Evidence

Dr. Rubenstein admits that the mechanism is unclear by which the HPV vaccine, in this factual context, can cause GBS, and he could not articulate a logical sequence of cause and effect as to how the vaccine could cause and did cause petitioner's recurrent GBS. Dr. Rubenstein did not point to specific facts about petitioner's clinical course, or to any medical literature, to support his theories. Dr. Rubenstein's three reasons for why petitioner's HPV vaccine contributed to her GBS lack foundational support. As for the first reason that Gardasil is a known antecedent to GBS, Dr. Rubenstein relies on the Souayah article. But as noted above, the Souayah article does not speak to the situation where GBS occurs after two viral infections and a vaccination. As for his second reason, that petitioner's clinical course following Gardasil was "totally different from her first presentation," Dr. Rubenstein does not explain his assertion of how or why petitioner's second episode of GBS was different from her first episode. Even if one assumes this statement to be true, Dr. Rubenstein does not explain why it matters, or how it supports his theory of causation. As for the temporal association between vaccination and onset, this fact alone is insufficient upon which to conclude that the vaccination caused petitioner's GBS. See Grant, 956 F.2d at 1148 (Fed. Cir. 1992) (holding "a proximate temporal association alone does not suffice to show a causal link between the vaccination and the injury").

Accordingly, the undersigned finds that petitioner has failed to provide preponderant evidence that there is a logical sequence of cause and effect showing that the HPV vaccination was the reason for petitioner's recurrent episode of GBS.

(3) Althen Prong Three: Proximate Temporal Relationship

Under Althen Prong Three, petitioner must provide "preponderant proof that the onset of symptoms occurred within a timeframe for which, given the understanding of the disorder's etiology, it is medically acceptable to infer causation-in-fact." De Bazan v. Sec'y of Health & Human Servs., 539 F.3d 1347, 1352 (citing Pafford, 451 F.3d at 1358). The acceptable temporal association will vary according to the particular medical theory advanced in the case. See Pafford, 451 F.3d at 1358.

a. Petitioner's Expert, Dr. Rubenstein

Dr. Rubenstein opined that petitioner had a recurrent episode of GBS "2 weeks post viral symptomatology and within 5 days of Gardasil vaccination." Pet'r's Ex. 10 at 2. Dr. Rubenstein testified that the symptoms of petitioner's GBS started to develop on March 30, 2010, Tr. 50, 53-54, and that petitioner had an "objective onset" of GBS on March 31, 2010, when a neurological examination showed that petitioner had no deep tendon reflexes, which would put the onset at five days. Tr. 98-100; Pet'r's Ex. 2.1 at 6.

In his expert report, Dr. Rubenstein, citing the Souayah article, states that the onset of GBS "within 5 days of vaccination is consistent with previously reported cases of GBS following

Gardasil." Pet'r's Exhibit 10 at 2. With a viral gastroenteritis, Dr. Rubenstein also testified that one would expect onset of GBS symptoms within five days to several weeks. Tr. 70. In cases of recurrent GBS, however, Dr. Rubenstein testified that onset can be shorter, with a range from two to three days to six weeks. Tr. 68, 71. Dr. Rubenstein did not offer testimony about a medically acceptable timeframe specific to his theory that petitioner's GBS was caused by viral infection and enhanced by the Gardasil vaccination.

b. Respondent's Expert, Dr. Kohrman

Dr. Kohrman testified that typically, in non-recurrent GBS cases, onset is "five-plus" days after an antecedent event. Tr. 153. Dr. Kohrman explained that the immune response requires time for the presentation of an antigen, for the antigen to be processed, and for there to be synthesis of antibodies. Tr. 153.

To opine about onset in cases involving recurrent GBS, Dr. Kohrman relied on the Slade article (4-42 days) and the Institute of Medicine ("IOM") report (five days to six weeks). Resp't's. Ex D at 6-7. Dr. Korhman explained that petitioner received her vaccine on March 26, 2010, and began having symptoms on March 28, 2010. He believes that the "two day interval" between petitioner's vaccination on March 26, 2010, and her first symptoms on March 28, 2010, is too short and inconsistent with the findings in the above-cited articles regarding onset. Id. at 7. Dr. Korhman opined that the gastroenteritis and URI that occurred in the 2-3 week window prior to onset are more consistent with the expected onset time frame. Id.

c. Evaluation of the Evidence

The undersigned finds that the onset of petitioner's recurrent GBS was approximately March 31, 2010, when a neurological examination showed definitive symptoms in that petitioner had no deep tendon reflexes. Thus, onset occurred approximately three weeks after petitioner's URI symptoms, two weeks after acute gastroenteritis, and five days after the HPV vaccination was administered. These onset timeframes would be medically acceptable if petitioner's GBS were caused by a viral infection via the mechanism of molecular mimicry.

Here, however, petitioner failed to provide testimony of a medically acceptable timeframe for onset given petitioner's theory that both a viral infection and the vaccine played a causal role. Even assuming that the onset would be the same under petitioner's proposed theory, thus meeting her burden under Althen Prong Three, petitioner has failed to make a prima facie case under Althen Prongs One and Two, and she is therefore not entitled to compensation.

C. Respondent's Alternative Causation Theory

Petitioner's medical records establish, and the parties do not dispute, that petitioner was diagnosed with and treated for viral gastroenteritis on March 19, 2010. See Jt. Sub. at 1; Pet'r's Ex. 2 at 10. Petitioner also suffered from a URI three weeks prior to the onset of her GBS. See supra II(C). Respondent and her expert, Dr. Kohrman, consistently maintained that petitioner's antecedent viral gastroenteritis or upper respiratory tract infection was the sole cause of

petitioner's recurrent GBS. See Resp't's Pre-Hearing Submission at 15; Resp't's Post-Hearing Brief at 14.

Under the Vaccine Act, compensation shall be awarded where the petitioner demonstrates the requirements set forth under the Act by a preponderance of the evidence, and "there is not a preponderance of the evidence that the . . . injury . . . is due to factors unrelated to the administration of the vaccine." § 300aa-13(a)(1)(A)-(B). The Act provides that "factors unrelated to the administration of the vaccine" are those "which are shown to have been the agent . . . principally responsible for causing the petitioner's illness, disability, injury, condition or death." Id. § 300aa-13(a)(2)(B). To satisfy her burden of showing an alternative cause of petitioner's injuries, respondent is "'required not only to prove the existence of [a factor unrelated], but also to prove by a preponderance of the evidence that the [factor unrelated] actually caused' the alleged injury." Knudsen, 35 F.3d at 549. Furthermore, [respondent] . . . . also ha[s] to present sufficient evidence to prove that the alternative factor was the sole substantial factor in bringing about the injury." Deribeaux v. Sec'y of Health & Human Servs., 717 F.3d 1363, 1367 (Fed. Cir. 2013) (citing de Bazan, 539 F.3d at 1354). "Thus to establish alternative causation . . . [respondent] must satisfy the three prongs of Althen." Deribeaux v. Sec'y of Health & Human Servs., No. 05-306V, 2011 WL 6935505 (Fed. Cl. Spec. Mstr. Dec. 9, 2011) (citations omitted), aff'd, 717 F.3d 1363 (Fed. Cir. 2013).

(1) Althen Prong One: Respondent's Medical Theory

Both parties' experts agree that a viral infection initiated petitioner's recurrent GBS via molecular mimicry. Tr. 72, 115-16, 161-62. Respondent's expert, Dr. Kohrman, further opined that a viral infection was the sole cause of petitioner's GBS recurrence, and that the HPV vaccine had no causal effect. See Resp't's Ex. D at 8; Tr. 140-41. During the hearing, Dr. Kohrman described the molecular mimicry mechanism by which an infection alone can cause GBS. Tr. 144-45. Specifically, Dr. Kohrman testified that molecular mimicry is sequence and/or conformational homology between an exogenous agent (foreign antigen) and self antigen leading to the development of tissue damage and clinical disease from antibodies and T cells. Resp't's Ex. L at 1. According to Dr. Kohrman, one of petitioner's antecedent viruses had a homology with her peripheral myelin. Tr. 170. And Dr. Rubenstein conceded that, had no vaccination taken place, his conclusion would also have been that petitioner's recurrent GBS stemmed from a viral infection. Tr. 84-85.

Through testimony and expert reports, both experts have identified molecular mimicry as a causal mechanism in this case and have agreed that, after being initiated by an infection, molecular mimicry can lead to recurrent GBS. Accordingly, the undersigned finds that respondent has proven, by a preponderance of the evidence, that one of petitioner's viral infections caused her GBS to recur. See Resp't's Exhibit G at 1.[9]

[9] Roger Baxter et al., "Recurrent Guillain-Barré Syndrome Following Vaccination," 54(6) Clinical Infectious Diseases 800-4 (2012).

(2) Althen Prong Two: Logical Sequence of Cause and Effect

In support of her argument that a viral infection was the sole cause of petitioner's injury, respondent notes that when petitioner initially contracted GBS in 1999, she had suffered a respiratory infection about two weeks prior. Resp't's Post Hearing Brief at 15; Jt. Sub. at 1. Respondent's expert, Dr. Kohrman, notes in his report that recurrent GBS is usually triggered by an upper respiratory infection. Resp't's Ex. D at 5 (citing Mossberg article).[10] During the hearing, Dr. Kohrman explained how, through molecular mimicry, an upper respiratory infection could cause GBS. Tr. 144-45. Specifically, Dr. Kohrman testified that one of petitioner's antecedent viruses had a homology with her peripheral myelin which led to an autoimmune response resulting in GBS. Tr. 170.

Respondent also notes that petitioner's GBS did not recur after any of the numerous vaccinations she received between 1999 and 2010. Resp't's Post Hearing Brief at 15. Therefore, Dr. Kohrman opined that one of petitioner's documented infections (upper respiratory infection, acute gastroenteritis) which occurred during the three weeks preceding GBS onset, was the "predisposing factor causing the recurrence of Cassandra's polyneuropathy." Resp't's Ex. D at 8.

The medical literature also indicates that there is a well-known cause and effect relationship between upper respiratory tract infections and GBS. In the Mossberberg article cited by respondent (Resp't's Ex. H – see fn. 9), patients with recurrent GBS were examined to determine the long term course of the disease and to search for factors predisposing the patients to recurrence. Resp't's Ex. H at 157. Of the 11patients with recurrent GBS that were examined, six had a preceding upper respiratory tract infection prior to the onset of their second recurrence. Of the total episodes of GBS that occurred, 24 of the 32 episodes were preceded by an upper respiratory tract infection. Id.

The undersigned finds that respondent has proven, by a preponderance of the evidence, that one of petitioner's antecedent infections was the "but for" cause of petitioner's recurrent GBS.

(3) Althen Prong Three: Proximate Temporal Relationship

Both parties' experts agree that the timing for a viral source for petitioner's recurrent GBS is medically appropriate. Dr. Rubenstein testified that, in cases of recurrent GBS, onset can take place within two to three days to six weeks. Tr. 68, 71. Dr. Kohrman opined that onset of recurrent GBS happens either from four to five days to six weeks. Resp't's Ex. D at 6-7.

The medical literature the parties submitted addresses the issue of timing. The authors of the Slade article stated that "8 of the confirmed cases [of Guillain-Barré syndrome] were within the 4- to 42 day window of biological plausibility." Resp't's Ex. K at 5; Resp't's Ex. D at 6-7. Likewise, the "Institute of Medicine determined that the plausible range of post-exposure latency

[10] N Mossberg et al., "The recurrent Guillain-Barré syndrome: a long-term population-based study," 126 Acta Neurol Scand 154-161 (2012)

for GBS to be 5 days to 6 weeks." Resp't's Ex. D at 6. In the Mossberg article, the authors found that the time from the triggering infection to the onset of RGBS [recurrent GBS] showed a tendency to shorten in successive episodes…" Resp't's Ex. H at 4.

As noted above, the onset of petitioner's GBS was March 31, 2010. The parties stipulate that petitioner was diagnosed with and treated for viral gastroenteritis on March 19, 2010. Jt. Sub. at 1. Thus, onset took place between nine and fourteen days after petitioner was diagnosed with viral gastroenteritis.

Regarding the upper respiratory infection, the undersigned has found that petitioner experienced the URI approximately three weeks prior to the onset of her GBS on March 31, 2014. Thus, the timeframe as supplied by both petitioner's and respondent's expert is also medically appropriate for a URI.

In light of the above, the undersigned finds that respondent has provided preponderant proof that the onset of petitioner's recurrent GBS occurred within a medically timeframe in relation to one of her antecedent infections.

IV. Conclusion

For the reasons discussed above, the undersigned finds that petitioner has not established entitlement to compensation and her petition must be dismissed. In the absence of a timely filed motion for review filed pursuant to Vaccine Rule 23, the clerk is directed to enter judgment consistent with this decision.

IT IS SO ORDERED.

s/Nora Beth Dorsey
Nora Beth Dorsey
Special Master